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SCIENCE NEWS LETTER

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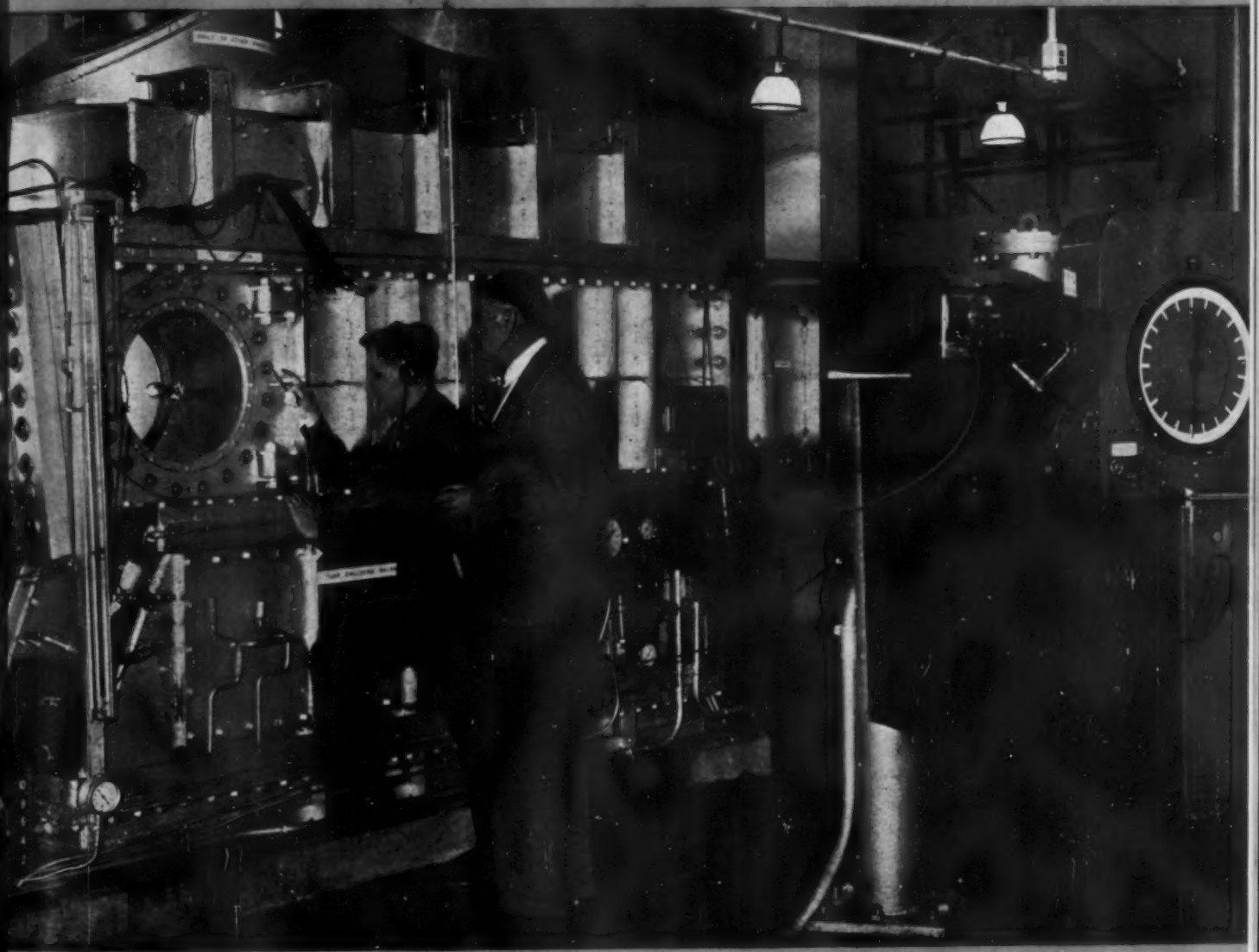
THE WEEKLY SUMMARY OF CURRENT SCIENCE • MAY 26, 1945



Supersonics

See Page 326

A SCIENCE SERVICE PUBLICATION

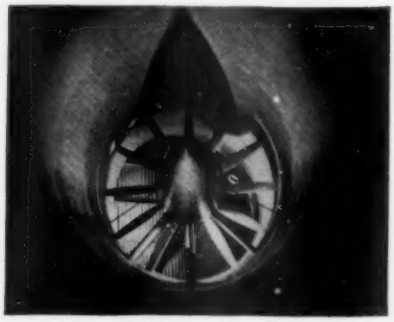
Life hangs by such threads

WANTED: Something to keep flyers from freezing. So engineers developed electrically heated goggles, shoes, suits . . . Something dependable to guide pilots in fog and dark. So engineers devised electrically driven gyroscopic instruments. . . . Something automatic to keep engines from overheating or cooling. And now comes an electric control the pilot needn't touch.

Working day and night, G. E.'s research and engineering staff has solved hundreds of such problems. The pictures here show how a few have been met. Through research come better electrical products and processes—in war or peace. *General Electric Company, Schenectady, N. Y.*

Flyers' lives often depend on their instruments. G-E workers use only tweezers to handle these precious parts of electrically driven gyroscopic instruments, dry them with air jets, oil them with hypodermic needles. They've *got* to be accurate.

Eyelids can freeze shut when you're 7 miles up! Electrically heated goggles, developed by G-E engineers, have fine wires embedded in plastic lenses. With G. E.'s electric blanket as a start, G-E engineers designed electrically heated flying suits, heated gloves and shoes being made in three G-E plants. Toughest problem was to devise heated gloves with thin wires strong enough to stand constant flexing.



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Before it's built, they *know* how it will fly! 18,000 horsepower of G-E motors blow winds faster than a pursuit plane can fly. Testing model planes and parts *up to full size and speed* in wind tunnels like this helps get new airplanes perfected quicker.

Making night landings safer. Engineers adapted the G-E "Sealed Beam" auto headlamps into war use—G-E airplane landing lamps 20 times brighter than those on your car. Sealed against dust, dirt and salt water damage, they cut down the peril of high-speed landings.

Hear the G-E radio programs: *The G-E All-girl Orchestra*, Sunday 10 p.m. EWT NBC—*The World Today* news, Monday through Friday 6:45 p.m. EWT, CBS—*The G-E House Party*, Monday through Friday 4:00 p.m. EWT, CBS.

GENERAL ELECTRIC

FOR VICTORY—BUY AND HOLD WAR BONDS

MEDICINE

Life-Saving Operation

The blood is diverted from normal channels and shunted through the lungs by artery joining in new attempt to save "blue" babies.

▶ A NEW operation which gives "blue" babies born with malformed hearts a chance to live has been devised by Dr. Alfred Blalock, professor of surgery at Johns Hopkins Medical School.

The operation, though life-saving, involves such vital structures that the doctors waited a year after devising it before they dared to try it. It has now been performed successfully on three children, Dr. Blalock and Dr. Helen B. Taussig, of the pediatrics department at Hopkins, report. (*Journal, American Medical Association,* May 19)

One was a 14-month-old baby girl weighing less than nine pounds, too weak to be able to sit up alone, refusing her feedings and steadily losing ground. The second was a 12-year-old girl who could not walk 30 feet without panting. The third was a six-year-old boy so incapacitated that he could not walk and would not try to take even a few steps.

Shortly after the operation he had changed from a "miserable whining child to a happy smiling boy," with cherry-red instead of purple lips and good skin color. From refusing even to try to walk, he protested vigorously against being kept in bed three and a half weeks after the operation while his temperature returned to normal.

The baby's improvement has been "striking". She eats well, is alert and active though before the operation she was so sick she seemed to be mentally retarded. Her weight has increased by one-fourth and she is learning to walk.

The older girl improved equally well. Two and one-half weeks after the operation she walked 60 feet, sat down and rested a short time, and walked another 60 feet without panting or other difficulty.

The surgery which has brought new life to these children and promises to do the same for others is an artery-joining operation. Each of them was born with a defect of the big artery supplying blood to the lungs. The artery was so narrowed that only a little blood could be pumped through it. That little blood could not pick up enough oxygen to supply the body. That was why the children were so weak, panted on exertion, and had deep blue colored skins.

To overcome the defect, Dr. Blalock cut one of the arteries supplying blood to parts of the body outside the lungs. One end of this artery was brought around and sewed to a slit made in the right or left branch of the lung artery. In this way some blood was shunted from the general supply to one of the lungs where it picked up oxygen to carry into the rest of the blood circulating throughout the body.

The operation is a long one, taking from an hour and a half to three hours. The chest must be cut open from the breast bone to the underarm line, ribs spread apart, the arteries found and cut away from adjacent tissues, and each artery clamped in two places to prevent hemorrhage when they are cut. The artery chosen to supply the extra blood to the lung artery was either one of two that normally supply blood to the neck, head, chest, shoulder and arm. The end not attached to the lung artery had to be tied securely to prevent bleeding. (Other arteries take over its normal job.)

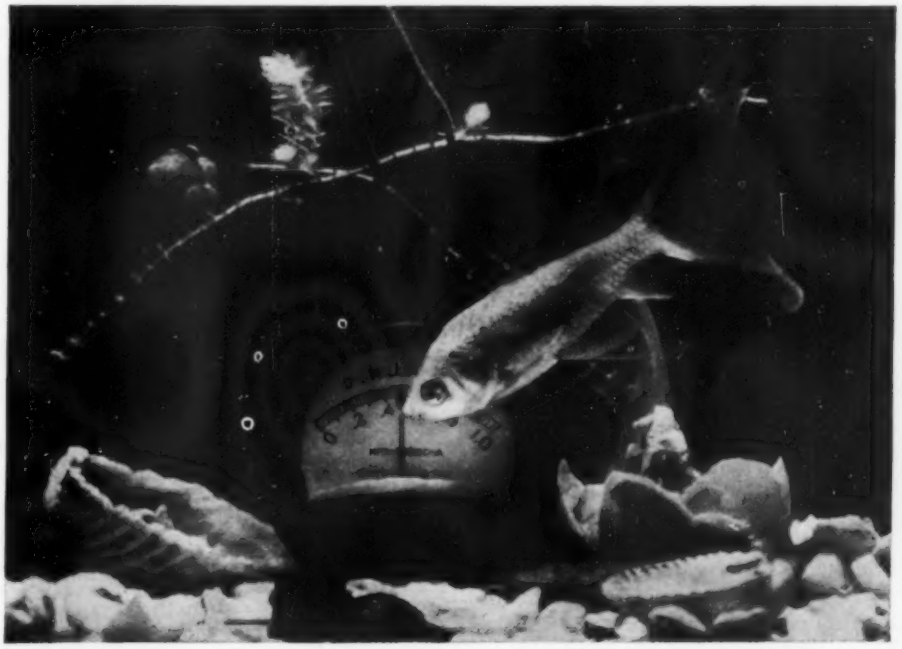
The lung had to be re-expanded and the cut in the chest wall closed.

During the operation, an artery to one lung had to be clamped so that no blood could get through for from half an hour to an hour and a half. The doctors were afraid a child already suffering from severe oxygen want would not be able to stand this strain. So they put off trying the operation for a year after they were sure it was otherwise a sound procedure. They hoped to find a way of giving oxygen by vein or some other way in addition to inhalation. Inhaling it takes it into the lungs but the children were unable, even before the operation, to get enough into their blood from their lungs.

Because of the war, it was impossible to get equipment for giving oxygen by vein. So they went ahead with the usual general anesthetics, ether for the baby and cyclopropane with a high concentration of oxygen for the other two children, and found the children came through the operation satisfactorily.

The operation will not help all patients with heart defects that cause persistent cyanosis (blueness of the skin), the doctors emphasize. It helps only when the primary difficulty is lack of blood circulation to the lungs.

Best age for the operation is between four and six years, though in some cases it must be done within the first few days



NO HARM DONE.—A new sealing process makes it possible for delicate electric instruments to remain days under water without injury. They withstand dust, fungi and temperature changes. ***(See next page)***

or weeks of life if the baby is to be saved.

Since the operation has never been done before, what the future holds for the children remains to be seen. They may later develop heart failure or subacute bacterial endocarditis, the doctors point out. They maintain, however, that fear of these conditions in the future, is "no justification" for letting the patient die of oxygen want in the present.

Science News Letter, May 26, 1945

ANTHROPOLOGY

Normal Face Measured

➤ HEADS of over 3,000 soldiers were measured to find the most comfortable gas-mask size. Ten different head types were established, and it was found that men from the South, where there is more of a native unmixed Anglo-Saxon strain, have the largest heads, while those who hail from New England have the smallest.

The tests were made under the direction of Dr. Earnest A. Hooton of Harvard University by a group of anthropologists, including John C. Kelly and Paul Reiter, in cooperation with the Chemical Warfare Service and the Massachusetts Institute of Technology. It is the first big study of its kind to be made by the Government.

A new measuring instrument, the "faceometer," was used in the tests conducted at Camp Sibert, Ala. This device measures the face in three principal dimensions—length, depth, and breadth—and 62 other facial landmarks. After considerable practice, operators can take all measurements in less than two minutes. The information gathered has helped the Chemical Warfare Service to find three types of gas masks which will fit every soldier in the Army.

As a result of the tests, the average head among men in the Army was found to have a face length, from tip of chin to nose depression between the eyes, of 124 millimeters (about five inches); face breadth, from temple to temple, of 141 millimeters (not quite six inches); and face depth, from tip of nose to ear passages, of 123 millimeters. These figures were supplied by Capt. R. A. Chadbourne of the Chemical Warfare Service in Boston.

Men from the ranks who were used as subjects represented every state in the Union, as well as Alaska, China and the Philippines. They were examples of a dozen racial extractions. Five normal and five unusual head sizes were established by correlating principal measurements representing breadth, depth, and length of face. The normal type includes an average head, two large, and two small sizes. The unusual types are those in which two of the principal measurements are normal, while the third is not.

It was found that 65% of the soldiers measured normal medium; 19% medium small, and 11% medium large. About 4% of the heads were small, while only 3% were large. In the unusual size, 7% had "short, fat faces," the largest single category in that group.

In addition to helping the Chemical Warfare Service design standard gas masks, these authoritative data have aided the Quartermaster Corps in determining hat sizes; the Army Air Forces, for goggles and head fittings; Ordnance, for placing of artillery gunsights and for headspace in tanks and other vehicles; and the Signal Corps for communication apparatus head fittings.

They also have a direct postwar bearing on fitting eyeglasses, manufacture of hats, dental and medical service; shape of telephone headsets; use of goggles and eyeshields in industry; spacing of seats and headroom in planes, trains, and buses.

Science News Letter, May 26, 1945

ENGINEERING

Delicate Instruments Remain Days Under Water

➤ DELICATE electrical instruments may remain for days under water without injury if sealed by a method developed and used by the General Electric Company that also protects them against humidity, dust, fungi, discolorization and other adverse conditions. Instruments so protected have been suddenly transferred from temperatures of 67 degrees below zero Fahrenheit to 165 degrees above without inflicting any change in their performance.

The method is the result of extensive research by scientists of the company to find a way to offset difficulties in the tropics, deserts and high altitudes, where electric instruments failed because of moisture, climatic and other conditions. It is claimed to be the first successful means of hermetically sealing an instrument with moving parts.

To obtain a hermetically sealed enclosure, a thick, special, stain-free glass window is fused to a metal ring in a glass-to-metal seal. This assembly is then fused to a steel case by a soldering joint. Hermetic sealing of the two terminal studs is obtained by glass-to-metal seals between each metal stud and the metal eyelet.

The final assembly is evacuated, filled with an inert gas through a tube located in the base, and is sealed off at a pressure slightly above atmospheric.

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ASTRONOMY

Comet Is on Schedule

Famous Pons-Winnecke comet, known for more than a century and last observed in 1939, is making its return this year as expected.

➤ FAMOUS Pons-Winnecke comet, known for more than a century and last observed in 1939, is making its return this year right on schedule. The Harvard astronomical clearing house has received a telegram from Dr. V. M. Slipher of the Lowell Observatory, Flagstaff, Ariz., stating that Henry L. Giclas, Lowell astronomer, had observed Pons-Winnecke.

Its position and motion agree well with positions predicted on the basis of the path followed by the comet in 1939. It is not exactly the same, however, for the comet has a period of revolution around the sun about one-half that of Jupiter. The big planet takes 12 years and the comet slightly more than six, so on alternate revolutions the comet passes near the planet. Jupiter's gravitational pull is so great it has been constantly enlarging the orbit of Pons-Winnecke.

In 1819, the year Pons at Marseille discovered it, the comet's nearest approach to the sun was about 72 million miles; in 1909 it passed within only 90 million miles, and in 1939 it was 102 million miles from the sun at nearest approach. This year about July 8 it is expected to approach within 108 million miles of the sun, which is 15 million miles farther out than the average earth-sun distance.

Mr. Giclas found the comet on May 3 to be of the 14th magnitude, making it invisible except in large telescopes or on long-exposure photographs. The comet will probably get brighter, but in 1939 it reached only the ninth magnitude, and this year it has not approached the earth as closely as in 1939 so tenth or eleventh magnitude is probably the brightest we can expect it to become. It will probably remain of observing interest only to professional astronomers and to amateurs with large telescopes.

Comet Pons-Winnecke is associated with a meteor shower last seen in 1916. We may see the shower again in 1946.

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Rediscovers Comet Kopff

➤ ONLY a few days after he had rediscovered one periodic comet which was returning to the sun right on schedule Henry L. Giclas, astronomer at Lowell Observatory, Flagstaff, Ariz., duplicated his discovery for comet Kopff, which is also running close to schedule.

Dr. V. M. Slipher, director of Lowell Observatory, telegraphed the Harvard Observatory clearing house reporting Mr. Giclas' second discovery and giving the position for comet Kopff on May 7 in the zodiacal constellation of Libra the Scales.

The motion of the comet will bring it into continually favorable observation for northern hemisphere observers. However, it is of the 13th magnitude, nearly as faint as comet Pons-Winnecke, located by Mr. Giclas earlier at the 14th magnitude.

Coincidence abounds in this re-discovery of these two periodic comets. They both take slightly more than six years to go around the sun and were last seen in 1939. They both are so faint as to be visible only in large telescopes, and neither is expected to be of anything like naked-eye visibility on this return. Pons-Winnecke passes the point in its orbit nearest the sun in July, and comet Kopff passes that position in its own orbit about a month later. Neither comet is following exactly the path computed for it because on its latest circuit of its orbit it passed very close to Jupiter, and was considerably perturbed by the gravitational action of that massive planet.

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MEDICINE

Streptomycin May Be Remedy for Typhoid

➤ STREPTOMYCIN, one of the newest of the penicillin class of anti-germ chemicals, may turn out to be a remedy for typhoid fever that will both get the patient well quickly and keep him from becoming a typhoid carrier.

Its use in five cases has been reported by Dr. Hobart A. Reimann, Dr. William F. Elias and Dr. Alison H. Price of Philadelphia. (*Journal, American Medical Association,* May 19)

Three of the five patients recovered during the streptomycin treatment, apparently as the result of it. In two cases there was an abrupt end of the fever and recovery quite unlike the usual course of events in typhoid.

The value of the drug cannot safely be judged on the basis of results in five cases, the doctors point out, particularly in typhoid fever, which is a disease of unpredictable severity and duration.

The drug was not available in time to give it early in the disease. The size of the doses and the way to give it, whether by mouth or by hypodermic injection, had to be worked out as the patients were being treated. These matters may have affected the results.

The evidence from the five cases shows, the doctors state, that streptomycin "offers much promise" as a substance capable of routing the typhoid germs from the blood and urinary tract when injected hypodermically in big enough doses and of eliminating typhoid bacilli from the intestinal discharges when given by mouth. This last suggests that the drug may keep typhoid patients from being carriers when they recover.

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MEDICINE-NUTRITION

Diet May Influence Resistance to Viruses

➤ RESISTANCE to virus diseases such as infantile paralysis can be influenced through diet but the exact method of doing it has not yet been worked out, Dr. C. A. Elvehjem of the University of Wisconsin told members of the American Chemical Society at a meeting in Milwaukee.

Mice starved of vitamin B_1 are definitely more resistant to infantile paralysis virus than mice getting optimum or excessive amounts of the vitamin.

However, he pointed out, we cannot try to prevent infantile paralysis by producing universal beriberi, the disease which results from lack of vitamin B_1.

When all the facts are known, Dr. Elvehjem said, the effect of diet on disease resistance will undoubtedly not be related to the amount of a single vitamin or nutrition factor but more likely to the ratio of several different ones.

He warned against drastic changes in the diet until the effects on the total nutrition are known. Nutrition programs that are harmful instead of beneficial may result, he said, if "we use too extensively the fragmentary knowledge which is now available."

Science News Letter, May 26, 1945

ORDNANCE

3,000 Miles-an-Hour!

Two new wind tunnels can produce speeds up to four times the speed of sound. One is for bombs, the other for ballistics.

See Front Cover

► TWO WIND tunnels costing a total of $2,000,000, that will produce speeds up to four times the speed of sound, about 3,000 miles an hour, have been dedicated at Aberdeen, Md., to the purposes of peace. The supersonic wind tunnels, one for bombs (shown on the front cover of this SCIENCE NEWS LETTER), the other for ballistics. are a part of the Army Ordnance Research and Development Center of the Aberdeen Proving Ground. Research work sneaked in before calibration of the bomb tunnel was completed saved the Army more than the cost of the entire installation by showing that a new 10,000-pound bomb, soon to go into production, was unstable. Other research at the wind tunnel has added 3,000 yards to the range of the 155-millimeter gun by changing the shape of the projectile.

Peacetime applications of the new wind tunnels are vast, reports Lt. Gen. L. G. Campbell, Jr., Chief of Army Ordnance. While the tunnels will be used in the remaining months of the war and for some time afterwards, for the development of new forms of bombs and rockets to improve accuracy, and to create guided missiles that may travel at extremely high speeds, they will also be available for nonmilitary research, Gen. Campbell believes. Within five years after the war, he predicts, 75% of the experiments carried out in the wind tunnels will be of a peacetime character. In addition to the Army research, the tunnels are now used by the Navy and the National Advisory Committee for Aeronautics.

The bomb tunnel and the ballistics tunnel are both contained in a new three-story brick building. The bomb tunnel is designed to produce air speeds up to 1.7 times the speed of sound, or about 1,300 miles an hour. When completed, the ballistics tunnel will provide air speeds of about 3,000 miles an hour. Both tunnels are a part of one closed circuit through which compressed air is forced by a five-unit power plant developing 14,000 horsepower.

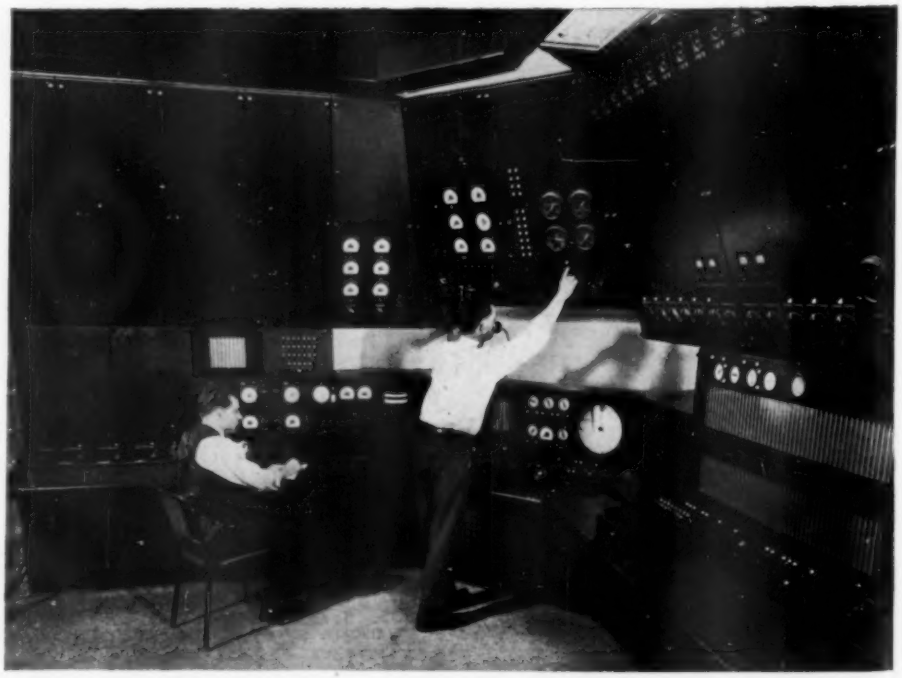
At supersonic speeds, the size and shape of a nozzle determines the speed attained. Nozzles are placed in the wind tunnel directly in front of the test section in which models to be examined are placed. In the bomb tunnel, this nozzle must be changed to attain different supersonic speeds. In the ballistics tunnel, a flexible throat nozzle is being installed so that air speeds may be changed by closing or opening it. This throat is made of long strips of quarter-inch steel plate, and the speed is changed by power-driven jacks which can close it to a one-inch aperture or open it to an 18-inch aperture. Thus it will be possible to reproduce speeds to which a projectile is exposed through its entire trajectory.

The test sections of the two tunnels are a little over a foot wide and a little under two feet high. In these sections on a special mounting rod are placed exact scale models, constructed of brass, of the item to be tested. These models can be nearly a foot long. Observation ports made of heavy glass, about a foot and a half in diameter, permit observers to view the model at high speeds and to photograph the airflow pattern around the projectile. Temperature in the bomb tunnel during tests is about 100 degrees below zero Fahrenheit.

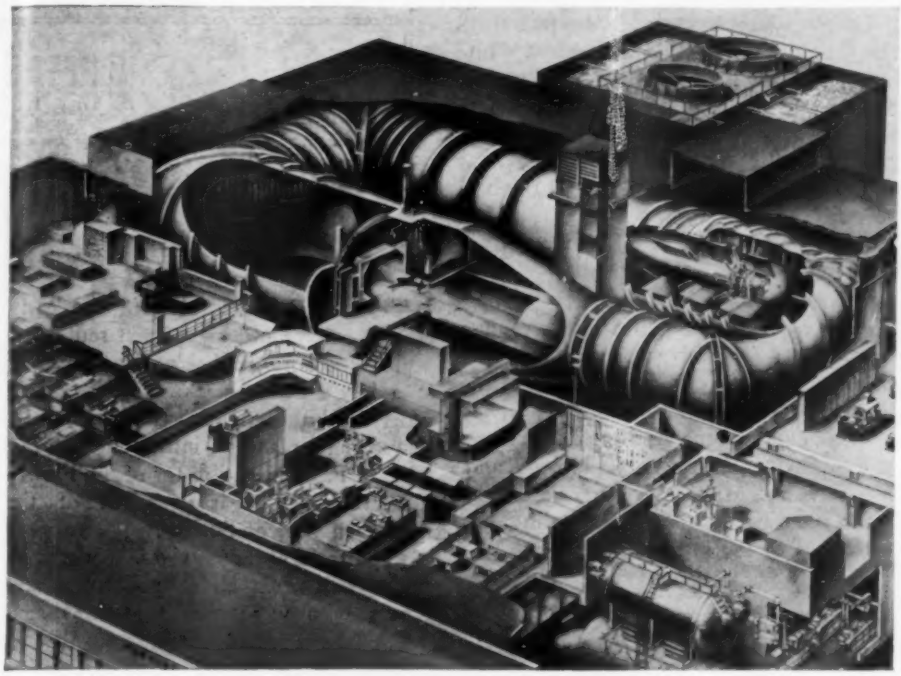
Instruments connected to the wind tunnel measure the three highly important factors in free flight of projectiles: lift, drag, and righting moment. Simply defined, lift is the force perpendicular to the projectile's path; drag is the retarding effect of the air; and righting moment is concerned with the true flight or stability as indicated by whether it yaws or tumbles.

In the wind tunnel the projectile is held still and air is blown past it. By the only other method used for checking on new designs, a ballistics range, the projectile has to be shot through the air and photographed in flight by high speed cameras.

The new wind tunnels were first suggested in 1940 to the Ordnance Department by Prof. Thedor von Karman of the California Institute of Technology who was a member of the scientific advisory committee of the ballistics research laboratory of the Ordnance Department. A board of the National Academy of Sciences with Dr. W. F. Durand, noted hydraulic and jet propulsion expert, as chairman, and made up of Dr. Hugh Dryden, of the National Bureau



REGULATES TUNNEL—Operation of the variable wind tunnel is regulated and observed by technicians manning this giant console, adjacent to the tunnel.



TESTS PLANES—Cutaway view of the giant new wind tunnel soon to be in operation at Buffalo which is capable of testing model airplanes at the lightning speed of jet propulsion at pressure conditions simulating 35,000 feet altitude. The tunnel contains an air volume of 210,000 cubic feet, equal to the cubic air volume of 16 six-room houses.

of Standards, Dr. F. R. Moulton, well-known astronomer, and Dr. Gano Dunn, electrical engineer, coordinated the development of the tunnel. A model tunnel was built at California Institute of Technology and this model was used for the basic design of the present tunnels. Construction took about one year. The wind tunnel laboratory is under the direction of Dr. Edwin P. Hubble, noted astronomer of the Mt. Wilson Observatory, on loan to the War Department for the duration. Research is supervised by Col. George G. Eddy, Director of the Ordnance Research and Development Center, who works directly with Maj. Gen. G. M. Barnes, Chief of the Research and Development Service of the Ordnance Department.

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PHYSICS

Wind-Tunnel Tests Speeds Up to 740 Miles an Hour

➤ A NEW $2,500,000 variable-density wind tunnel, capable of testing model airplanes at the 740-mile-an-hour speed known as "speed-of-sound" range, has been revealed by G. W. Vaughan, president of the Curtiss-Wright Corporation. The wind tunnel, largest of its kind in the nation, can be used to test jet-propelled airplane models with wing-spans up to 10 feet under atmospheric pressure conditions comparable to those found at 35,000 feet above the earth, about four pounds to the square inch.

Designed with the cooperation of the California Institute of Technology, the new Curtiss-Wright wind tunnel will enable engineers to test models of all types of planes, thus accomplishing in one place work which previously has been performed in three or four tunnels. This is made possible by the mammoth tunnel's extreme flexibility of testing range.

The operation of the tunnel is fundamentally simple. When engineers are ready to gather data on a plane, a model of the plane, exact to one thousandth of an inch, is installed on a test platform in the 8½ by 12 foot test chamber and air is set in motion by two 16-bladed, 22-foot diameter fans working in tandem. Wind may be blown to stimulate winds up to many times tornado speeds. Thus aerodynamic forces created are like those experienced by an actual plane in flight. By using a nozzle in front of the test chamber, air at high speed can be compressed further, creating a stronger blast.

At the control panel, an operator records the air load forces simultaneously by punching a button which causes the measured forces to be computed on perforated cards. Data on the punched cards later are appraised to determine full-scale airplane characteristics, thus eliminating possible errors in design long before the actual construction of the plane.

The overall length of the tunnel is 178 feet. Its overall width is 81 feet. It stands 36 feet from the ground at its maximum height. A 115,000-volt power supply is needed for the tunnel for use with the 14,000 horsepower drive motors that turn the big fans. Employing four special compressors, air in the tunnel may be pumped to four times atmospheric pressure, or 60 pounds to the square inch. Three-quarter inch steel used in the building of the shell of the tunnel is similar to that used in the construction of a heavy U. S. destroyer.

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CHEMISTRY

Chemical From Mushrooms For Treating Poison Ivy

➤ A CHEMICAL from mushrooms may in future become a remedy for ivy poisoning, Prof. Irwin W. Sizer and Clemens E. Prokesch, of Massachusetts Institute of Technology, report in *Science*.

The chemical is tyrosinase, an enzyme found not only in mushrooms but other plant and animal tissues. It is the one responsible for darkening of potatoes and bananas when left exposed to air.

One of the better methods of treating skin poison ivy, the scientists point out, involves oxidation of the poison with strong oxidants such as ferric chloride and potassium permanganate. Believing that the same results might be obtained with innocuous agents such as enzymes, the scientists tested the effects of tyrosinase.

In four of their numerous experiments, they put poison ivy plus tyrosinase on the skin of human volunteers for four hours. Another part of the skin was treated in the same way except that the tyrosinase had first been inactivated by boiling. The area treated with the active enzyme showed much less skin irritation than the control area treated with the inactivated tyrosinase.

"If successful results can be obtained in the future by applying the enzyme some time after the toxicant (poison ivy irritant) has reacted with the skin, even after erythema (reddening) has been produced," the scientists state, "then a new method of treating poison ivy dermatitis will be available."

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MEDICINE

Cancer of the Kidneys Diagnosed by New Method

➤ CANCER of the kidneys, bladder, prostrate and other organs of the urinary tract may be diagnosed by a simple method recently developed for diagnosing cancer of the uterus, Dr. George N. Papanicolaou and Dr. Victor F. Marshall of Cornell University Medical College and New York Hospital, report in *Science*, (May 18).

The method depends on the fact that cancers of the uterus and of the urinary tract shed superficial cells which can be obtained for examination almost as easily as if the cancers were located on the outside of the body.

Of 83 cases in which this diagnostic method was tried, 27 were reported as positive for cancer. Of these 27, clinical diagnosis was positive in 21.

The method is simple, easy for the patient and inexpensive. If further study shows it lives up to its present promise, it might be valuable, the doctors point out, in periodic health examinations such as those conducted in public health clinics for detecting early or unsuspected cancer. It should also be useful in cases when repeated examinations are necessary to clear up an obscure diagnosis or to follow results of operations or other treatment.

Science News Letter, May 26, 1945

PHYSICS-GENERAL SCIENCE

Astronomer Offers Theory Linking Mind and Matter

➤ A THEORY which offers new light on many phenomena hitherto not explained, such as the relationship between mind and matter and the connection between the will and muscular activity, has recently been published by Dr. Gustaf Stromberg of the Mt. Wilson Observatory staff. (*Journal of the Franklin Institute*)

Dr. Stromberg's article, entitled *The Autonomous Field*, is an outgrowth of ideas from Einstein's general theory of relativity and modern wave mechanics, concepts which are now included in our present theory of the atom. From the popular point of view, the most interesting feature of the autonomous field theory is that it is applicable not merely to inanimate objects such as stars and radiation, but to living tissues as well—in particular, to the actual development of an embryo within the human body.

Of special interest also is the fact that the theory is in striking agreement with experimental results obtained by Dr. H. S. Burr of the Yale Medical School on the oscillations of electric fields surrounding plants and animals.

It was the desire to understand the organization in the living world and the origin of consciousness which first gave impulse to Dr. Stromberg's study.

"The autonomous field theory is applicable to both the organic and inorganic world," Dr. Stromberg stated. "The novel idea introduced by Faraday more than a century ago, that fields have properties of their own, is thus vindicated by recent developments in physics and biology, and can serve as a starting point for a deeper understanding of nature, including the workings of the human mind."

Science News Letter, May 26, 1945

ENGINEERING-AERONAUTICS

Glass Fiber Blankets Absorb Sound in Planes

➤ SOUND insulation on multi-engined bombers is accomplished with blankets composed of down-like glass fibers as thin as five hundred-thousandths of an inch in diameter, reported Willis M. Rees and Robert B. Taylor of Fiberglas Research Laboratories at the meeting of the Society of Motion Picture Engineers. These blankets, weighing 2½ ounces to the square foot will be the basis for products that will meet the sound-control requirements of motion picture, television and radio industries after the war, they predicted.

Friction of pulsating air molecules against the walls of crevices in porous materials dissipates sound energy into heat, and it is in this way that most sound absorption is provided, Mr. Rees pointed out. Within limitations, the greater surface area provided by these crevice walls, the greater the sound absorption. There is a great increase in the total surface area of a pound of glass fiber as the fiber diameter decreases.

"Further research may demonstrate that acoustical values are functions of the fiber diameter and of the surface area of the fibers that make up the material," Mr. Rees stated.

He pointed out that glass fiber materials provide a group of non-burning products apparently subject to more complete control than has ever been possible in acoustical research, although there are not enough data at present on which to base scientific conclusions.

Science News Letter, May 26, 1945

IN SCIEN

ASTRONOMY

May 4 Meteoric Fireball Burst Near Chester, Pa.

➤ THE FIREBALL seen in the early morning hours of May 4 burst southwest of Philadelphia, probably near Chester, at a low altitude, preliminary study of nearly a hundred reports sent in by newspaper readers indicates to Dr. Charles P. Olivier, director of the Flower Observatory, who is president of the American Meteor Society.

Reports from housewives, workers on night shifts, invalids, policemen and others who were awake at 3:30 a.m. when the meteor plunged earthward were collected through the cooperation of newspapers publishing Science Service dispatches.

Science News Letter, May 26, 1945

CHEMISTRY

Diatomaceous Earth Used In Filtering Water

➤ DIATOMACEOUS earth will be used to filter water in all new purification units shipped to the armed forces in the Pacific as a result of tests conducted by the Engineer Board, Fort Belvoir, Va. The new filter, experiments showed, not only removes the cysts of amoebic dysentery but also filters out the blood flukes prevalent in Philippine waters.

Another improvement featured by the new purification units is the glass-fiber tank which, coated with Buna S rubber, replaces the old canvas type. It will not mildew and is little affected by climatic changes. Whereas the canvas tank loses a considerable quantity of water before the fibers swell to waterproof proportions, the new type is waterproof and fills at once.

It is presumed that U. S. troops going directly to the Pacific field from Europe will take their old-style purification units with them, and plans are being made to equip them with the newer type. The procurement division has ordered several thousand of the new units of 15 and 50 gallons per minute capacity. There are now in the field about 20,000 of the small, half-gallon per minute units.

Science News Letter, May 26, 1945

E FIELDS

AERONAUTICS

Army's C-82 Cruises At 200-Miles-an-Hour

➤ THE ARMY'S newest twin-engine air cargo transport, the C-82 "Packet," can cruise through the air at 200 miles an hour, 20 miles an hour faster than was expected, flight tests at Hagerstown, Md., and Miami, Fla., reveal. It can fly as high as 22,000 feet on two engines, or to 8,000 feet on a single engine with a full load. The plane could fly non-stop from New York to Los Angeles and part of the way back if necessary, since it has a maximum range of 4,000 miles.

Powered by two Pratt and Whitney 2,100 horsepower engines, the Packet can carry 18,000 pounds of cargo on a 500-mile trip or 13,000 pounds on a trip of 1,500 miles. It is expected that 1,500 miles will be about the longest single hop that cargo planes will be called on to make in practical use on overland air routes.

Built by Fairchild Aircraft, the C-82 shoots up at a steep slant in take-off. After a run of 800 feet from a dead stop, it clears the ground and gains more than 50 feet of altitude in the next 1,800 feet.

Science News Letter, May 26, 1945

CHEMISTRY

Study of Biogeochemistry Undertaken by Museum

➤ A THREE-year preliminary survey of biogeochemistry has been initiated under the auspices of the American Museum of Natural History. In charge of the work will be Prof. G. Evelyn Hutchinson of Yale University; associated with him are Prof. Paul F. Kerr of Columbia University, Prof. W. A. Albrecht of the University of Missouri, Dr. Martin D. Kamen of the University of California, and Prof. Edward J. Conway of University College, Dublin.

Biogeochemistry is the investigation of the effects of earth chemicals of various regions on the life of plants, animals and human beings that inhabit them. Everyone has heard of such isolated instances as prevalence of goiter in areas lacking in iodine, of mottled teeth where there is too much fluorine in the water, of sick and crippled farm animals in regions where the soil contains an excess of selenium. Oceanographers make chemical analyses of water from all the earth's oceans and seas as a matter of routine; but with the exception of pioneer work done some time ago in Russia by the late W. I. Vernadsky nothing comparable has been done for the chemistry of the land areas.

The present survey will undertake to assemble and evaluate all obtainable existing data, as well as to initiate new researches in fields where results appear promising.

Science News Letter, May 26, 1945

PHOTOGRAPHY

Simple Paint-brush Method For Applying Emulsions

➤ A NEW simple paintbrush method of applying photographic gelatin-silver-halide emulsions to metal sheets, so that patterns can be photographed on the metal to guide workers in building airplanes, has been described by Faurest Davis of Ansco. Although there are several methods now in use, including silk screen and stencil devices, the photographic method of transferring engineering drawings to the work itself by photographic means has proved highly satisfactory in a number of aircraft plants.

The process described by Mr. Davis begins with heating a bulk emulsion gel to a temperature of 110 degrees Fahrenheit in a double boiler or water jacket. These and other operations must be carried out in a darkroom, under proper safelight conditions. A homogenizer or stirrer with stainless steel fittings, running at 5,000 revolutions a minute, is next used to blend glycol-monobutyl-ether with the liquefied emulsion. The substance acts as a gelatin leveling agent. After about two minutes of stirring, considerable foaming occurs and a few drops of another substance are added to prevent air bubbles. The mixture is then ready to be spread on the metal. Materials to be sensitized are usually coated with a flat white lacquer free of sulfides and other contaminants, and heated to about 100 degrees Fahrenheit to allow the emulsion to level out before becoming stiff.

The warm, liquefied emulsion is applied with a soft paintbrush. Up to 1500 square feet can be covered with a gallon of the mixture. This brings the cost of the sensitizing material down to about one cent a square foot.

Science News Letter, May 26, 1945

CHEMISTRY

X-rays Now Used to Make Chemical Analysis

➤ CHEMICAL analysis of gases, liquids and solids by shooting a beam of X-rays through them, is a new and rapid means of identifying the chemical elements in the material, developed by Dr. Herman A. Liebhafsky and Dr. E. H. Winslow in the General Electric research laboratory. Another scientist in the laboratory, H. Millard Smith, has found a practical way of measuring the X-ray absorption, on which the new method depends, by a photoelectric X-ray intensity meter.

X-rays are intimately related to the inner atom, so they furnish a means of counting the numbers and indicating the kinds of atoms by which they are absorbed. The count is unaffected by whether the atoms are free or have combined to form molecules of any sort whatsoever. An oxygen atom, Dr. Liebhafsky explains, will have the same absorption for X-rays, whether it is free or in the oxygen molecule, or in liquid water, ice or steam, or in sugar or in sand.

In the X-ray absorption method developed by Mr. Smith, the invisible rays fall on fluorescent material which becomes luminous where they strike. This material, called a phosphor, is painted on the glass envelope of a phototube of the multiplier type.

With such a tube the light from the phosphor falls first on a sensitized surface within the tube, and electrons are emitted from it. These electrons are multiplied by electronic amplifiers, producing a current that can be measured.

Science News Letter, May 26, 1945

CHEMISTRY

Fumes Endanger Health In Silver Soldering

➤ FUMES given off in silver soldering contained such a high concentration of cadmium that exhaust ventilation was installed in a Kansas City silver manufacturing plant to protect the health of the workers by collecting the fumes at their source.

Analysis of a solder sample revealed it was 18% cadmium, while further investigation showed that silver solders sometimes contain as high as 70% cadmium. The plant laboratory, upon recommendation of the Industrial Hygiene Service, is trying to develop a satisfactory solder not containing cadmium.

Science News Letter, May 26, 1945

ASTRONOMY

Jupiter, Evening Planet

With the arrival of June, it is the only planet remaining in the evening sky. Saturn sets too soon after the sun to be seen easily.

By JAMES STOKLEY

➤ WITH THE ARRIVAL of June, only one planet remains in the evening sky. This is Jupiter, appearing in the southwest in the constellation of Leo, the lion. As it is brighter than any other star or planet (minus 1.6 in the scale used by the astronomer), one has little difficulty in locating it. Its position is indicated on the accompanying maps, which show the appearance of the sky at 11:00 p. m., your own kind of war time, on June 1, and an hour earlier on the 15th. Similarly they would show the appearance at 9:00 p. m. at the end of June, only then the sky will hardly be dark enough to show the stars.

Brightest of the stars now seen (and which, unlike planets, shine by their own light like our nearest star, the sun) is Vega, in lyra, the lyre. This is in the northeast. Just below Lyra is Cygnus, the swan, with first magnitude Deneb, though its low position at this time makes it seem fainter. This is the reason that its symbol on the maps is that for the second magnitude. The same is true of the star shown just above the northern horizon—Capella, in Auriga, the charioteer. Actually, this is brighter than any of the stars shown, except Vega, and when we see it high overhead on winter evenings we can fully appreciate it. But when it is so low, its light has to pass through a great thickness of the earth's layer of atmosphere and apparently it drops to third magnitude. To the left of Auriga is part of Gemini, the twins, in which we see Pollux, likewise fainter than normal.

Arcturus in South

High in the south is the bright star Arcturus, in Bootes, the bear driver, and below it is Spica, in Virgo, the virgin. Next to this group, below and toward the left, is Libra, the scales, in which there are no bright stars. But next to Libra we come to part of Scorpius, the scorpion, with first magnitude Antares, red in color, which will be so prominent in the southern evening sky during the coming summer months.

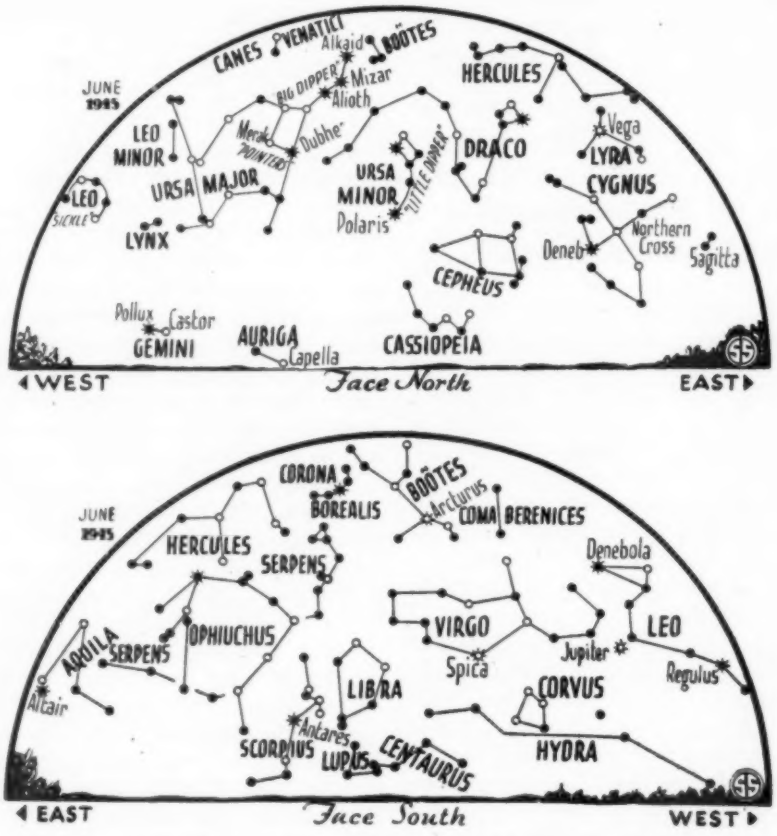
Just below Libra are parts of the constellation of Lupus, the wolf, and Centaurus, the centaur. The latter is the one in which alpha Centauri, nearest star to the earth (except the sun) is located. In this age it does not rise for people in most parts of the United States. It is visible, however, from the southernmost parts of Florida and Texas.

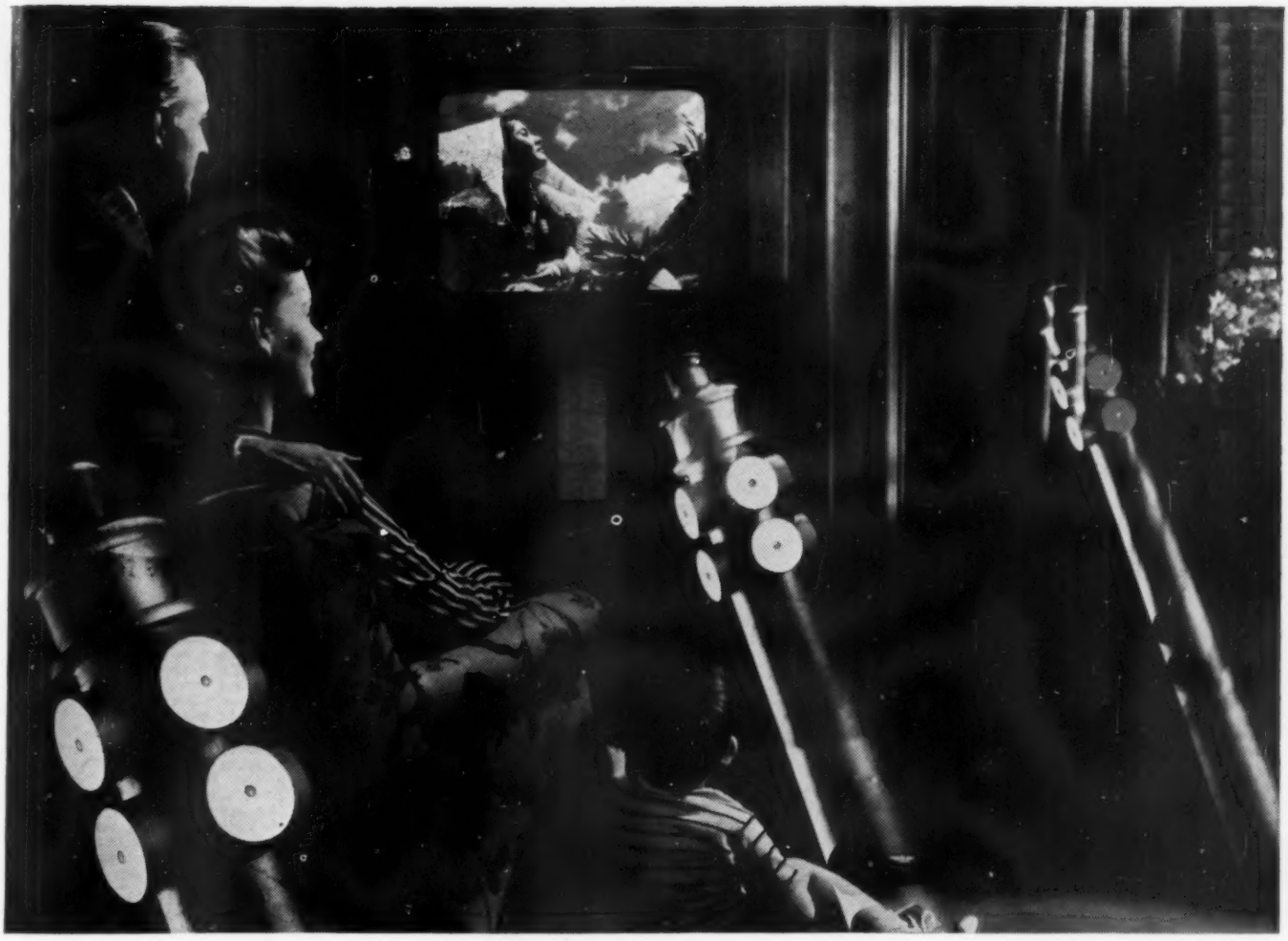
There are two other first magnitude stars (also indicated by second magnitude symbols because of their lowness) shown on the maps. One is Regulus, in Leo, the lion, the group in which Jupiter appears. This is in the west. Directly opposite is Altair, in Aquila, the eagle.

One welcome astronomical event of June is the summer solstice, which occurs on June 21 at 2:52 p. m. EWT. Then the sun reaches its farthest north position in the sky and, for us in the northern hemisphere, summer begins. In the southern hemisphere, on the contrary, this marks the start of winter.

Though Jupiter is the only planet well placed for evening visibility in June, Saturn is also in the evening sky but sets too soon after the sun to be seen easily. It is in Gemini, the twins, below Castor and Pollux. On June 11, there will be an occultation of Saturn, with the moon passing in front of it and hiding it for about an hour. This will occur during the day, however, and will not be visible. This is also true, though for a different reason, of a partial eclipse of the moon which will occur June 25, as the moon partly enters the shadow of the earth. It happens while the moon is below the horizon for this part of the world, but it will be visible from the Pacific, Indian and Antarctic Oceans, Asia, Australia and southeast Africa.

Rising in the east well before sunrise, and shining there even more brilliantly than Jupiter, is Venus, which was so brilliant in the evening sky until a few





RCA radio-relay towers—like those phantomed above—will leap the hurdle of *distance* in post-war television.

Coast-to-Coast Television...through "Radio-Relay"

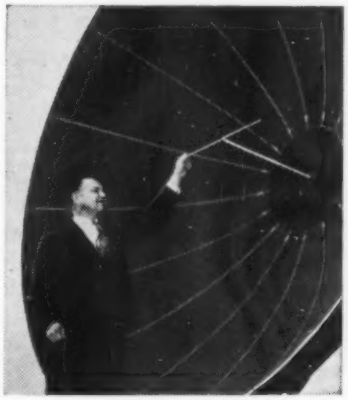
For a long time it looked as though post-war television might be confined to local stations. Only persons within a fifty-mile radius of New York, for example, would see the important television broadcasts from NBC's pioneer station WNBT, atop the Empire State Building.

That was because the ultra short waves that carry television do not bend with the curvature of the earth. They go in a straight line out to the horizon—and then keep on going into the sky.

But today, television's big handicap of short range has been completely overcome—by RCA scientists and engineers.

The *radio-relay* was developed—a tower that "bounces" television programs to the next tower 30 to 50 miles away. Through a network of these automatic, unattended, radio-relays, coast-to-coast television is made practical.

This is but one more example of how RCA research constantly "makes things better." Such research is reflected in *all* RCA products. And when you buy a television set, or radio-phonograph, or anything made by RCA, you enjoy a unique pride of ownership. For if it's an RCA you can be sure it is one of the finest instruments of its kind that science has achieved.



C. W. Hansell, RCA specialist in transmitters and relays, is shown here with a radio-relay reflector that can "bounce" radio messages, radiophotos and Frequency Modulation programs at the same time that it relays television!

RADIO CORPORATION of AMERICA

PIONEERS IN PROGRESS

RCA

Do You Know?

The *cashew nut* and poison ivy belong to the same plant family.

Meat from exercised *cattle* is more tender than that from more close-stalled animals.

Gallium, a little known chemical element, is 150 times as abundant as silver.

Over 20 different *chemicals* and materials are used in the ordinary kitchen match.

The word *protein* was coined about 1839 by Mulder, who lived from 1802 to 1880.

Formerly almost all of the *cigarette paper* for U. S. smokes was imported from France; now it is made in America.

Piston rings of gray cast iron have been replaced in many war engines by stronger ones, alloyed of iron, nickel, chromium and molybdenum.

Because of incessant *rains* during last fall, that prevented plowing and seeding, France expects a short wheat crop this year.

The production of *silk* was a closely guarded secret in China for many centuries; in the third century A.D. the Koreans brought the art to Japan.

U. S. Forest Service *"smoke-jumpers"* and their flame-fighting tools are parachuted to forest fires in regions inaccessible by roads.

Tarnish is removed from silverware by placing the silver in an aluminum pan and heating in a mild solution of soda; electrolytic action carries the tarnish to the aluminum, darkening it somewhat but leaving silver bright.

Anyone Can Use A Slide Rule

No Math Background needed if You Have the *Practical Slide Rule Manual* by J. M. Klock, Mathematician for the U. S. Navy

An absolutely non-technical explanation of how to really use a slide rule for the fundamental math calculations. Indispensable for the man in the shop, and the student of all math and sciences. Special applications made to formulas from mathematics, engineering, aeronautics, air navigation, projectiles. Includes office applications to per cent, interest rates, and cost accounting. Large illustrations. Simple explanations. Get this booklet today and learn to use a slide rule.

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months ago. And near it is the planet Mars, still faint, but beginning to brighten. Early in June Mars and Venus approach to within a distance about ten times the moon's diameter, but then they draw apart again.

From a correspondent in Boston comes a question about magnitudes of stars and planets. The astronomer's system, with its minus and plus magnitudes, may seem rather complicated, but one need only consider the whole series of numbers, whether negative or positive, as continuous, with two one less than three, one as one less than two, zero one less than one, minus one one less than zero, minus two one unit less than minus one, and so on. And the lower the number, the brighter is the object. Magnitude six is brighter than magnitude seven, and so also, magnitude minus two is brighter than magnitude minus one.

Goes Back 1700 Years

The system goes back some 1700 years, to the Alexandrian astronomer Ptolemy, who wrote a famous book on astronomy, called the *Almagest*, in which appeared the first catalog of stars, giving their relative brightnesses. Ptolemy divided them into six classes, or "magnitudes." The brightest he put in the first magnitude, while in the sixth he placed those which could just be seen. After the telescope came into use in the seventeenth century, still fainter stars were observed, and so the system was extended. With the largest telescope today, the 100-inch at Mt. Wilson, it is possible to see stars down to the 19th magnitude and to photograph them as faint as the 22d.

In 1830 Sir John Herschel, in England, found that an average star of the first magnitude was just about a hundred times as bright as the average sixth magnitude star, and that the same ratio applied even down through those too faint to be seen with the naked eye. To provide a uniform and scientific system, another English astronomer, named Pogson, proposed in 1850 that a fixed scale of stellar magnitudes be adopted, with each magnitude just 2.512 times the brightness of the next fainter class. This figure was selected because this ratio makes a difference of five magnitudes exactly 100 times the difference in brilliance. Lists of stars usually give their magnitude to the nearest tenth, which is the least that an expert can distinguish, although the "electric eye," or photoelectric cell, can detect variations of a hundredth of a magnitude.

Ptolemy grouped all the brightest stars together as first magnitude. Sirius is about fifteen times, or three magnitudes as bright as Regulus, though both were placed in this class. Therefore, when the magnitude scale was placed on a scientific basis, it was necessary to provide places for the brighter stars, and so the scale was extended downwards, to zero and to negative magnitudes. But even here the same Pogson's ratio holds; i. e., minus one magnitude represents a star 2.512 times as bright as magnitude zero, minus three 2.512 times as bright as minus two, and so on. Sirius is thus placed at magnitude minus 1.6; Venus, as seen in the morning sky this month, minus 4; the full moon minus 12.5 and the sun minus 26.7.

Celestial Time Table for June

June	EWT	
3	9:15 a.m.	Moon in last quarter
6	7:51 a.m.	Moon passes Mars
	5:17 p.m.	Moon passes Venus
7	4:00 p.m.	Moon nearest, distance 225,900 miles
10	12:26 a.m.	New moon
11	2:02 p.m.	Moon passes Saturn
16	5:22 p.m.	Moon passes Jupiter
19	1:00 p.m.	Moon farthest, distance 251,400 miles
21	2:52 p.m.	Sun farthest north, beginning of summer in northern hemisphere
24	3:00 p.m.	Venus farthest west of sun
25	11:08 a.m.	Full moon; partial eclipse of moon visible in eastern hemisphere

Subtract one hour for CWT, two hours for MWT, and three for PWT.

Science News Letter, May 26, 1945

AERONAUTICS

Superfortress Gets Fighter-Plane Engines

➤ LIQUID-COOLED in-line engines of the type common to such fighter planes as the P-38, P-40 and P-51 now power an experimental B-29 Superfortress, replacing the radial aircooled engines with which the plane is usually equipped. The object of the experiment was to give additional flight data and experience in the use of in-line liquid-cooled engines as applied to heavy bombers, the Air Technical Service Command at Wright Field reports.

Cooperating with the Air Forces in the successful test was the Allison Division of General Motors, manufacturers of the engine. Prior experience in the use of the liquid-cooled engine in heavy airplanes had been gained in work with the modification of the B-19, in which similar engines were installed.

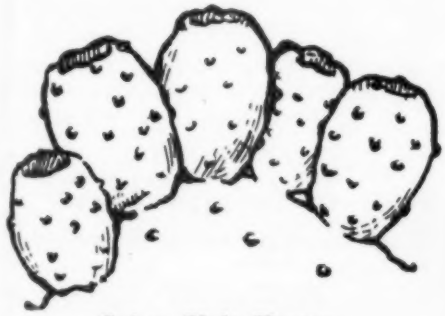
With the new engines the modified B-29, known as the XB-39, develops a total of 10,400 horsepower from its four engines.

Science News Letter, May 26, 1945

BOTANY

NATURE RAMBLINGS

by Frank Thone



Spiny Globe-Trotter

➤ THE CACTUS FAMILY as a whole is pretty strictly American, and most of its 1500-odd species have remained in their native hemisphere. But a few kinds of the oval-jointed prickly-pear cactus have penetrated into practically every part of the world where the climate suits them. They have made themselves so thoroughly at home that in most places where they now grow they are regarded as part of the native vegetation.

In most places the prickly-pear cactus was introduced as a botanical curiosity for rock gardens, or possibly for its edible fruits. Once established, it has shown a mobility in migration astonishing in a plant not equipped with any special means of dispersal. Where it has been considered useful or ornamental, the cactus has of course had plenty of willing human aid; but it has also managed to spread over wide areas of semi-arid land where man-assisted propagation is out of the question.

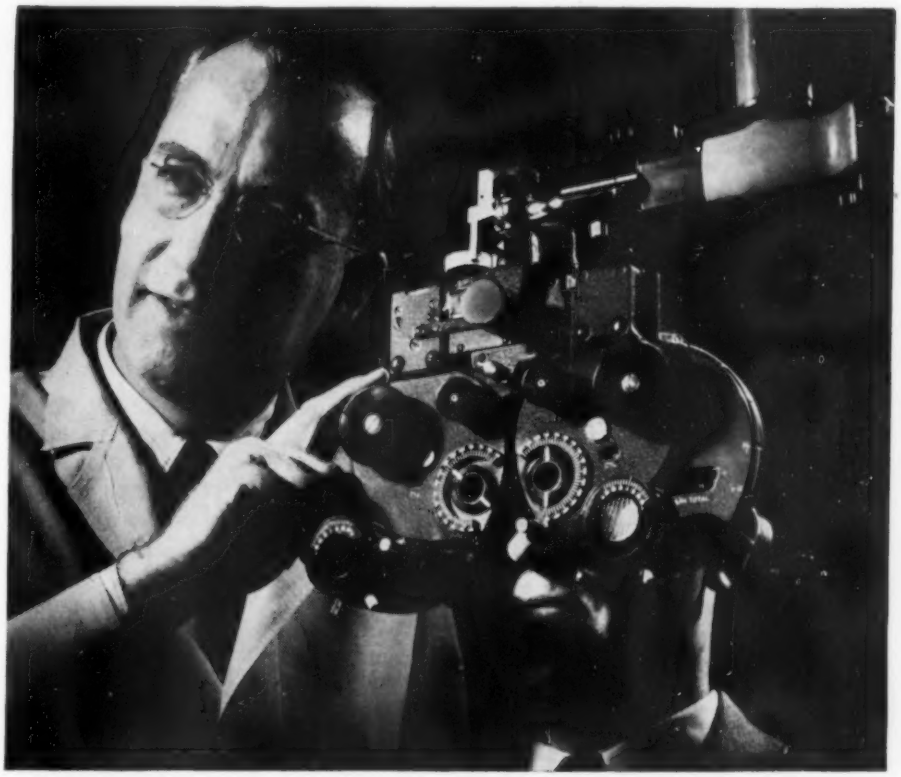
Lack of special dispersal means may have been largely offset by the high survival ability of the plant. One of its leathery-skinned, succulent joints, chance-snagged on the wool of a sheep, might ride only a few hundred yards or at most a mile or so. But where it fell off it would not perish like the twig or leaf of an ordinary plant; it would strike root and grow up into a healthy, bristly cactus bush. The role of birds, rodents and other animals in carrying cactus seeds is not at all well known, but it must be of some significance.

In some of the lands to which it has been carried, prickly-pear has become a major pest. Most spectacular, of course, was the case of Australia, where the plant was rendering millions of acres of the best grazing and farm lands unusable. Importation of the cactus moth as a counter-pest came just in the nick of time. On the other hand, cactus is a prized hedge plant on Madagascar and one or two other tropical islands where cattle are numerous and have to be kept out of yards and gardens.

Prickly-pear cactus demonstrated its capacities as an emigrant plant very early. It appeared in the Mediterranean basin very soon after the discovery of America, and in a few decades was all over the lands on both shores. It has become so common in Palestine, for example, that one of the most common of artists' anachronisms is to paint it into Biblical scenes as part of the landscape of 2,000 or more years ago.

Science News Letter, May 26, 1945

On a quality basis, *juice* from small oranges averages better in flavor than juice from large fruit, has more solids, is richer and sweeter, and has a higher vitamin C value.



A Matter of Life and Death

During 1945, nearly a hundred thousand Americans will lose their lives—*victims of home-front accidents.* Three times that many will suffer permanent disability. And the cause for many of these accidents will be faulty vision, or vision unsuited to its tasks.

You might never think of an eyesight examination as a matter of life and death. But the things you do at work, at home, on the farm, or in traffic—the hazards of everyday living—require efficient, alert eyesight. Keen vision is safe vision; reduction of accidents is a matter of national urgency.

The only way you can be sure about your vision is to consult an ophthalmologist or optometrist for a complete visual analysis. If correction is called for, you can depend on the professional and technical skills of the optometrist or optician to provide modern attractive eyewear.

Play safe—*be sure your vision is right.* Bausch & Lomb Optical Co., Rochester 2, New York.

BAUSCH & LOMB

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PUBLIC HEALTH

May Not Be T. B.

➤ MANY MEN rejected for the armed forces because of healed tuberculosis may be eligible for such service. They probably did not have tuberculosis, even though X-ray pictures of their lungs showed areas of calcification.

This is one of two medical surprises turned up in a U. S. Public Health Service Study of some 3,000 student nurses. The study is reported by Dr. Carroll E. Palmer in *Public Health Reports* (May 11).

Calcification of the lungs is generally taken as evidence of healed tuberculosis. It may also be due to another disease, histoplasmosis, Dr. Palmer's report shows.

This disease comes from a fungus called *Histoplasma capsulatum*. It has been known as a rare and always fatal ailment. It may, however, be a very common infection, occurring in a form so mild as not even to be recognized as a sickness. This is the second surprise turned up in the study reported by Dr. Palmer.

Starting point for the study was a growing doubt that lung calcification showing in X-ray pictures always was due to healed tuberculosis. Part of the doubt came from the geographical distribution of the X-ray findings. A lot more people with lung calcification were found in one part of the country than in another. Selective Service examinations, for example, showed a variation from 6% in Oregon to 28% in Kentucky.

The geographic distribution of people with lung calcification, moreover, did not correspond with the distribution of tuberculosis throughout the country.

The idea that lung calcification always meant healed tuberculosis became even more doubtful when it was found that large numbers of those with calcified spots on their lungs had negative tuberculin reactions. A negative tuberculin reaction means that the person has not been infected with tuberculosis. Consequently the calcified spots on his lungs must have had some other cause.

So when the Public Health Service with the National Tuberculosis Association started making chest X-rays and tuberculin tests on some 10,000 student nurses throughout the country, Dr. Palmer took the opportunity to investigate this question of a nontuberculous origin of the lung calcification.

Clues from other scientific studies pointed to histoplasmosis and to San Joaquin Valley Fever, another fungus infection with the scientific name of coccidioidomycosis. Skin tests something like the tuberculin test were made for these two infections.

San Joaquin Valley Fever was soon ruled out. Only a very few student nurses gave a positive test for this and they had lived or traveled in the Southwest where it is prevalent.

With the histoplasmosis test, the story was different. Among student nurses with a positive reaction to this test, but not to tuberculin, 31.1% had lung calcification. Among those reacting positively to tuberculin but not to histoplasmin, 10.4% had lung calcification. In the large group of more than 2,000 who had negative reactions to both tests, only 1.2% showed lung calcification.

Wide geographic differences were also found. Among nurses who had lived almost all their lives in Minnesota, less than 5% showed any reaction to histoplasmosis, while more than 60% of those in Missouri were sensitive to this substance.

If, as seems likely, a positive skin test with histoplasmin means the person has been infected with the fungus or a related organism, the studies show that the infection in mild form is very common in certain states. They also show that histoplasmosis is probably the cause of a very high proportion of lung calcifications seen in chest X-rays of persons with negative tuberculin reactions.

The states where lung calcification is a frequent finding and where histoplasmosis is probably common in mild form are: Kentucky, Arkansas, Illinois, Indiana, Iowa, Maryland, Mississippi, Missouri, North Carolina, Ohio, Tennessee, Virginia and West Virginia.

Science News Letter, May 26, 1945

GENERAL SCIENCE

Baku on Caspian Sea Now Has Science Academy

➤ THE AZERBAIJAN Academy of Sciences at Baku, the oil center, has been added to the roster of the world's scientific bodies. Geologists, physicists, biologists and other scientists and technologists are now at work exploring the raw materials and working out new methods and processes for the industries and agriculture of this republic of the U.S.S.R. which lies on the eastern side of the Caucasian Mountains.

Chromite, the ore of chromium needed for steel alloying, as well as ores of cobalt, barium and aluminum have been discovered. Cotton yields have been increased.

The autonomous academy replaces a branch of the U.S.S.R. Academy and the new organization starts with 15 academicians under the presidency of Dr. M. Markazimov.

Science News Letter, May 26, 1945

Anaxagoras, who lived from 500 to 428 B.C., was banished from Athens for teaching that the sun was a red-hot stone, and the moon simply another earth that does not shine by its own light.

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Books of the Week

➤ THE PROBLEM of "Lebensraum" may have been solved for Germany by World War II—at least it served to cut down the population there to a considerable extent. But in many other parts of the world, the increasing number of men, women and children who need food, clothing, education and the various freedoms, combined with the decreasing acreage of good farm land which is being rapidly lost through erosion and waste pose a gigantic and urgent problem. The authors of POPULATION ROADS TO PEACE OR WAR, Guy Irving Burch and Elmer Pendell, (*Population Reference Bureau*, paper, $1.; cloth, $2), believe it to be the principal problem of those who will sit around the peace table. Unless a reasonable and effective solution is found, they believe, there can be no permanent peace. They urge vigorous measures of education for planned parenthood, migration restrictions for any country that fails to control its own population increase, sterilization laws and more strict marriage laws.

Science News Letter, May 26, 1945

➤ ALL AVIATION ACTIVITIES of the calendar year 1943 and as recent as May, 1944, are found in digest form in the new illustrated JANE'S ALL THE WORLD'S AIRCRAFT 1943-1944, compiled by Leonard Bridgman (*Macmillan*, $19.) Although the volume is complete and detailed on military and civil aviation as well as data on aviation engines, it is regrettable that it does not contain such up-to-date airplanes as the B-29 Superfortress, or P-61 Black Widow. It is, however, a valuable reference and gives details on foreign aircraft not readily available elsewhere. The current issue of this annual contains nearly 700 photographs as well as charts and drawings.

Science News Letter, May 26, 1945

Just Off the Press

THE AUTOBIOGRAPHY OF SCIENCE—Forest Ray Moulton and Justus J. Schifferes, eds. —*Doubleday*, 666 p., $4.

CAREERS IN SCIENCE — Philip Pollack — *Dutton*, 222 p., illus., $2.75.

THE COMING AGE OF ROCKET POWER—G. Edward Pendray—*Harper*, 244 p., illus., $3.50.

THE DIETARY OF HEALTH AND DISEASE—Gertrude I. Thomas—*Lea*, 308 p., illus., $3.50, 4th ed.

ESSENTIALS OF BODY MECHANICS IN HEALTH AND DISEASE—Joel E. Goldthwait and others—*Lippincott*, 337 p., illus., $5., 4th ed.

THE FARMER'S SHOP BOOK—Louis M. Roehl —*Bruce Pub.*, 446 p., illus., $2.48, 8th ed.

MAINSPRINGS OF CIVILIZATION—Ellsworth Huntington—*Wiley*, 660 p., illus., $4.75.

THE MALE HORMONE — Paul de Kruif — *Harcourt*, 243 p., $2.50. Enthusiastic story about the chemical identification and synthesis of the male sex hormone, and its uses, both present and potential. Of course, consult your doctor.

PRACTICAL SLIDE RULE MANUAL—Jack Klock—*Edwards Brothers, Inc.*, 36 p., paper, illus., $1.

PRE-INCAIC HUAMACHUCO, Survey and Excavations in the Region of Huamachuco and Cajabamba—Theodore D. McCown—*Univ. of Calif. Press*, 399 p., paper, illus., $2.

PRINCIPLES OF FIREARMS—Charles E. Balleisen—*Wiley*, 146 p., illus., $2.50.

WORLD GRAIN REVIEW AND OUTLOOK, 1945—Helen C. Farnsworth and V. P. Timoshenko—*Food Research Inst., Stanford Univ.*, 319 p., illus., $3.

Science News Letter, May 26, 1945

MEDICINE

Yellow Fever Found in Wild Animal in Brazil

➤ YELLOW FEVER is a disease that most of us need not worry about, though a couple of generations ago the very word was terrifying. It is a disease that our health officials worry about because they know that the mosquitoes which spread it still exist in the United States. So long as we do not have any yellow fever patients from whom the mosquitoes can pick up and spread the germs, we can remain free from the danger of this disease. With people flying all around the world as they do these days, however, it takes constant watching at our borders to make sure no one comes in with unsuspected yellow fever. Mosquitoes themselves must also be watched for, since otherwise infected ones could come in on a plane and escape to cause damage.

The fight against yellow fever is going on even more actively in those regions of Africa and South America where the disease still exists. Latest word from this front concerns a sick monkey, a marmoset, trapped at Ilheus, in Brazil, by scientists of the Rockefeller Foundation's International Health Division. This animal had in its blood the virus of yellow fever, from which it soon died.

This is the first time in any country that a wild animal has been picked up in its natural habitat suffering from yellow fever. The finding lends support to the theory that yellow fever is "primarily a disease of jungle animals transmitted by jungle mosquitoes."

Those who must travel to yellow fever regions can be protected against the disease by a vaccine. The rest of us depend for protection on the activities of our health authorities and of scientists who are still working to learn more about yellow fever in the hope of perhaps eradicating it even from its jungle lair.

Science News Letter, May 26, 1945

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The Mosquitoes of New Jersey
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⚙ *MICROPHONE for use in noisy locations transmits only the message. It looks like the ordinary instrument, but has two vertical slots on its sides through which the extraneous noises enter and strike opposite sides of the diaphragm at the same time, thus cancelling each other. A front slot admits the voice.*

Science News Letter, May 26, 1945

⚙ *METAL-COATED plastic buttons, insignia, and automobile trimmings have a thin protective layer of metal applied evenly by the electroplating process. The finished product looks like metal but is lighter in weight and cheaper to produce.*

Science News Letter, May 26, 1945

⚙ *IMPROVED LUBRICANT for drills used in drilling metals is a heavy material with a paraffin wax base and looks like shoe polish. Conveniently packaged, it is easy to apply and helps provide maximum life for the cutting tool without distorting the hole.*

Science News Letter, May 26, 1945

⚙ *AIR-COOLED flatiron, in which the outside surface, except the base or soleplate, is kept cool even in continuous use, has air intakes around the edge of the sole. Two inclined air-chutes along the inner sides of the dome-shaped top, with escape slots over the iron's heel, permit air circulation.*

Science News Letter, May 26, 1945

⚙ *MIDGET PUMP for marine engines, shown in the picture, weighs only 22 pounds but will deliver 250 gallons*

of water a minute and requires but one horsepower to operate. Based on the principle of the Archimedes screw similar to the worm in the familiar meat grinder, it has two screws with a step between.

Science News Letter, May 26, 1945

⚙ *SPECIAL CONTAINER, to fly blood from America to battlefronts, is a box less than two feet on each side. Made of kraft fiberboard, it is covered on both sides with aluminum foil and fastened to a balsa base. It holds 19 pounds of ice, which keeps 24 pints of blood below 54 degrees for 60 hours.*

Science News Letter, May 26, 1945

⚙ *SAFETY CLASP pin, to replace ordinary safety pins, has flat upper and lower jaws joined at one end by a resilient spring between which is slipped the material to be held together. The pin is mounted on the upper jaw in such a position that it cannot prick the flesh.*

Science News Letter, May 26, 1945

⚙ *MUSICAL wind instruments and horns of a new type, which practically avoid the use of pipes and tubes, have in their interior construction covered channels or grooves forming a number of ducts alternately directed in substantially opposite directions. They are made of metals or plastics.*

Science News Letter, May 26, 1945

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 260.

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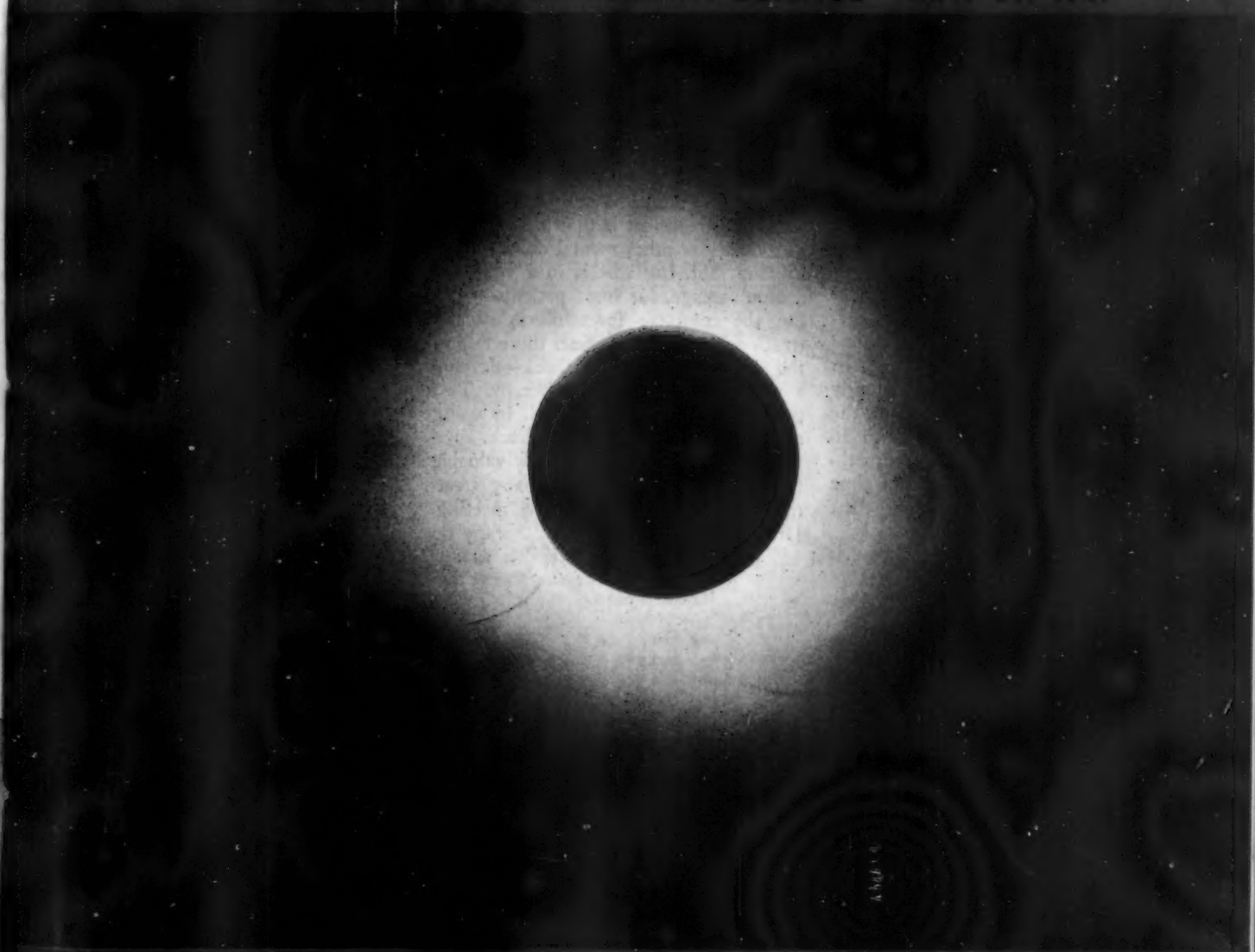

Total Eclipse

See Page 340

A SCIENCE SERVICE PUBLICATION

PSYCHIATRY

New Shock Treatment

A new kind of electric shock through the brain cures many of mental diseases. The throb of current is very brief and memory is not lost.

➤ MEN AND WOMEN living shut away from reality in a world of diseased fancy, or suffering from the despair of extreme depression are now being restored to mental health by a new kind of electric shock through the brain.

Success with the new treatment for some of the most common types of mental sickness, such as schizophrenia and manic-depressive psychosis, was reported to the American Psychiatric Association independently by Dr. W. T. Liberson, of the Institute of Living, Hartford, Conn., who developed the treatment, and Dr. Douglas Goldman, of Longview State Hospital, Cincinnati.

Secret of the success of the new treatment is that the electricity is regulated so that each throb of the alternating current is extremely brief—only about one half of one thousandth of a second. In the ordinary house current previously used for the electric shock treatment, the pulse of current lasts from eight to 16 thousandths of a second. The new method uses what is believed to be the time that will affect the nerve with the smallest amount of electric power.

Because each throb of the current is so very brief, the treatment can be kept up for a longer time without damage to the brain cells through which it passes.

Both old and new methods produce a convulsion similar in appearance to an epileptic fit. But with the new method, the convulsion lasts longer. It is less severe, Dr. Liberson reported. Patients are able to get up after the treatment and walk out of the room without confusion, walking steadily.

Out of 46 patients who had only this type of treatment, 25 recovered and another four improved.

Chief advantage of this new "brief stimulus" treatment is that it avoids loss of memory or other mental damage, Dr. Librson said. But this is in a way also a disadvantage, for some patients—lacking the complete forgetfulness of the treatment that characterizes those taking the older form of electric shock—develop a vivid antipathy to the therapy. This can be reduced, he explained, by using a sedative drug before the shock.

The new method is especially valuable for old people who need many treatments, Dr. Goldman told the meeting. Dr. Goldman used the new therapy on 125 patients with very favorable results.

Science News Letter, May 31, 1947

PSYCHIATRY

Drug Helps Some Epilepsy

➤ NEW HOPE for children suffering from two serious disabling diseases is offered by the new drug, tridione, Dr. Eugene Davidoff, assistant director of Craig Colony, Sonyea, N. Y., reported to the meeting of the American Psychiatric Association in New York. He has been trying the drug on 75 patients.

Children stumbling about with the clumsy trembling movements often due to injuries to the brain at birth, are quieted down and enabled to move more normally. The drug works for about 65% of these cases known to the doctor as "spastic cerebral palsies of the milder type."

Those with "petit mal epilepsy", in which they lose consciousness very briefly, perhaps falling down and picking themselves up again many times in the same day, are helped in about 60 cases out of 100.

These two diseases which keep thousands of children out of school or tied to a wheel chair have been fairly hopeless in the past.

The new drug is not so successful with the more severe type of "fits" which the doctor calls "grand mal epilepsy." Only 30% of those cases were helped, Dr. Davidoff found.

Reduction in the number of attacks was not always accompanied by an improvement in the pattern of electric signals which doctors can pick up from the brain cells. Only half of the 75 patients had a better brain wave pattern after treatment with tridione, it was found.

In about one case out of five, the drug had some poisonous effects, Dr. Davidoff found. These toxic effects can be kept at a minimum, he said, by careful regulation of the dose and by watching the patient in a clinic or hospital. About 10 or 15 persons out of each hundred cannot tolerate the drug.

Both the toxic effects and the changes in brain wave pattern are aids in estimating the effects of the drug and the type of patient who should be given it.

Science News Letter, May 31, 1947

MEDICINE

Two New Chemicals Keep Chiggers Away Pleasantly

➤ YOU DON'T have to go around smelling of sulfur to keep the chiggers away any more. Two new and pleasanter anti-chigger chemicals are benzyl benzoate and dimethyl phthalate. This latter is the more practical from the standpoint of availability, a husband and wife team of entomologists, Mary H. and Charles D. Michener, report in the current issue of *Natural History*.

Dimethyl phthalate kills chiggers quickly and is found in some of the newer commerical brands of mosquito repellents. You can apply it to your skin, but its effectiveness wears off in four or five hours. For an all day hike through regions likely to abound in chiggers, it is more practical to apply it from the mouth of a small bottle around the tops of boots or socks, waistband, shirt front, cuffs and any other edges of openings in your clothes. This forces the chigger to cross the treated line in order to get inside your clothes and attack you. Still better protection comes from spraying the chemical on your clothes or dipping them into a water emulsion of it. Benzyl benzoate, if you can get it, can be applied in the same way.

Chiggers should not be confused with jiggers or chigoes. These are small fleas which burrow into the skin. Chiggers are mites and they do not burrow. Neither do they suck blood. They inject a digestive fluid into you to dissolve the tissues so they can suck them up. Your skin reacts to this by hardening the cells on all sides of the path of the potent juice. A tubule or sort of miniature well is formed which is often as deep as the chigger is long. The liquefied tissue is contained within the hardened walls. Probably the action of the digestive fluid is what makes the bite itch.

Science News Letter, May 31, 1947

MEDICINE

Test KR for Cancer Here

The Russian anti-cancer endotoxin is being tested in the U. S. on mice. Material for humans is not yet in sight. Results encourage further research.

➤ THE WIDELY heralded Soviet KR cancer endotoxin is being tested in the United States.

All U. S. tests so far are on mice. Any treatment of human patients is "not yet in sight."

Dr. Theodore S. Hauschka, of Lankenau Hospital's Institute for Cancer Research in Philadelphia, reported the first tests to the American Association for Cancer Research.

He told the scientists that the results with mice are sufficiently encouraging to warrant further intensive work on the problem.

He said that every letter he gets from a patient or a physician asking for some of the material will delay still further the day when trials on humans might be made. He works without a secretary. Every time a letter comes, he must stop working on the anti-cancer serum to type the answer.

He works across the street from the hospital, in a house so old that the city of Philadelphia had condemned it. The hospital renovated it for Dr. Hauschka's laboratory, partly to give him more space and partly to safeguard patients and the hospital's mouse colony from the germs of deadly Chagas' disease.

Germs Produce Material

These germs, called Trypanosoma cruzi or T. cruzi for short, produce the anti-cancer material discovered by the Soviet scientists, Dr. Gregory Roskin and his wife, Dr. Nina Klyueva. This anti-cancer material is called an endotoxin. It is neither a serum nor, strictly speaking, a vaccine. It is obtained from the blood plasma of mice that have the germs in their bodies.

The growth of cancers in mice can be slowed and occasionally the cancers can be completely abolished in mice infected with T. cruzi. But since the disease is sometimes fatal to humans, it is not practical to give the germs to the humans. What is given is the endotoxin the germs produce, which is free of all the outer shell of the germs and which does not cause Chagas' disease.

This material produced softening and partial destruction of cancers in Dr. Hauschka's mice, just as the Soviet scientists reported. But the mice themselves died of liver and kidney damage.

This is one reason Dr. Hauschka says "No" to all requests for material to be given to patients. The U. S. material is not yet safe to use.

Second reason why the material is a long way from being ready for trials on human patients is the difficulty of getting enough of it. This is also an important reason why the Soviet scientists were not able to send samples to American scientists for testing.

Made from Blood Plasma

The material has to be made from the blood plasma of infected mice. A mouse does not have very much blood in its body. All the blood you can get from a single mouse makes only one unit of KR anti-cancer material. One of the four patients successfully treated in Russia got 7,750 units over 69 days.

At that rate, there isn't a breeding establishment in the country that could raise enough mice to make material for treating all the cancer patients. And it would take the full time of one technician for every patient to infect the mice, bleed them and process the material. The mice have to be bled at exactly the right stage of the infection. That means injecting the germs into mice every day, keeping a series of them going, so as to have material for treatment every day.

If you wonder how the Russians were able to get material for treating patients, part of the answer is that they have only treated 57 patients and have been working on the method since 1939.

Of these 57, only four have been successfully treated. In these four, three men and a woman, the cancers went away. But it is only about a year (11 months when the report was received in this country) since the first patient was "cured." And as even the layman knows, cancer cannot be called cured until at least five years have elapsed without a return of symptoms.

It takes a special strain of the Chagas' disease germ to produce the anti-cancer material. Dr. Hauschka has been working with several different strains. His latest tests were made with the same one, called the R. strain, the Soviets used.

Miss E. M. Johnson, trypanosome expert of the U. S. National Institute of Health, flew to England last February to get it for Dr. Hauschka from the Wellcome Laboratories of Tropical Medicine. Dr. Cecil A. Hoare there has kept the R. strain going in mice since 1936. It was first cultured 10 years earlier by Dr. Reichenow in Hamburg, Germany.

Science News Letter, May 31, 1947

NUCLEAR PHYSICS

Electron Beam Made Visible by Its Own Light

➤ VISIBLE LIGHT is given off from moving electrons in a new atom-smashing machine, and the electron beam has been made visible by its own light, General Electric engineers have revealed.

This is believed to be the first time this effect has been observed, Dr. C. G. Suits, G. E. director of research, states. The observations were made in the 70,000,000-volt synchrotron, a new type of atom smasher built for the U. S. Naval Research Laboratory.

Electrons are electrical particles bearing negative electrical charges. According to the electron theory all matter consists

ELECTRON LIGHT—The spot of light in the center is the radiation directly from the electron beam inside a 70,000,000-volt synchrotron's vacuum tube. The horizontal line of light is caused by reflections and other distortions produced by the glass walls.

HORTICULTURE

NATURE RAMBLINGS by Frank Thone

From Many Lands

➤ ALL QUARTERS of the globe meet at the crossroads of our garden paths. Contributions from the Old World predominate, for we are after all transplanted Europeans, but the Americas make substantial offerings as well.

The triad that every home gardener sets out, no matter how tiny his plot—lettuce, radishes, and onions—all seem to have started somewhere near the eastern end of the Mediterranean. At any rate, they were there at the dawn of history, for we find them mentioned in ancient Egyptian inscriptions. There is one document about the earliest strike on record: laborers in some pharaoh's monumental project refused to go back to work until they got more radishes and onions to eat with their bread.

Cabbage is European, from the chalk cliffs of England, and across the North Sea in Denmark and the Low Countries. Wild cabbage still grows in these places; though you would hardly recognize the little, open rosette of leaves as ancestral to the tight round heads we harvest—or hope to, anyway. The cabbage-head is really an exaggerated central leaf-bud.

Carrots and beets are of Eurasian origin also. Although carrots have run wild in this country as a weed (Queen's lace), beets have shown no tendency to do so. Peas, too, are from the Old World, as are cucumbers and cantaloupes. Watermelons are African in origin.

New World vegetables include potatoes, tomatoes, green peppers, pumpkins, most squashes, and all beans except the little-used Windsor or broad bean and the table soybean which is just coming into real popularity. Sweetcorn, too, is American, though the Indians made little use of it before the arrival of white men.

Some of these American vegetables reached our gardens by roundabout paths. Potatoes, for example, were carried to continental Europe from South America, thence to England and Ireland, from there to Bermuda, and finally to the colony of Virginia.

You may smoke while you cultivate your garden. You may also use a nicotin spray to combat certain insect pests. In either, you are making use of another American plant: tobacco was used by most of the Indians of both continents when Columbus landed, and was not known before then in other parts of the world.

Science News Letter, May 31, 1947

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PHOTOGRAPHY

Lens Changes Instantly From Long to Close Shots

➤ LONG SHOTS and close-ups will cause motion picture camera operators no trouble in the future, thanks to a new lens that makes it possible to instantly change from one to the other. The lens is not yet ready for production, but will be soon. A version of it for television is perfectd and has already been demonstrated.

The type demonstrated is the Fairbanks television lens developed for Jerry Fairbanks, Inc., by Dr. Frank G. Back. Called also the Zoomar lens, it was recently given tests in the laboratories of the National Broadcasting Company in New York. It gives increased efficiency and flexibility, it is claimed.

The motion picture lens, which should be completed in six months, is a more compact version of the Zoomar lens than the television type. It is for use in the 35-millimeter field, either in the studio or in the open in taking newsreels. It gives the newsreel unlimited scope. Any event can be photographed with one camera without interruption as the cameraman regulates the lens for the proper focal ranges.

Science News Letter, May 31, 1947

MEDICINE

New Vitamin to Be Found Will Aid Anemia Victims

➤ A NEW VITAMIN is waiting to be discovered. It exists in liver and will help pernicious anemia victims. It might be called, when discovered, the anti-nerve degeneration vitamin because its function would be to prevent the nerve degeneration that develops in some patients with pernicious anemia.

Existence of the vitamin is suggested by studies reported by Dr. Tom D. Spies of the University of Cincinnati and the Nutrition Clinic, Hillman Hospital, Birmingham, Ala., at the meeting in New York of the Spies Committee for Clinical Research.

Synthetic folic acid, newest member of the vitamin B family, acts as an important blood builder in many kinds of anemia, including pernicious anemia. It cannot, however, be counted on to protect against the nerve degeneration that sometimes develops in pernicious anemia. The condition begins with the feet and hands tingling and "going to sleep" and may go on until the patient is incapacitated or paralyzed if not treated. Adequate amounts of potent liver extract protect against it.

"These observations suggest there is another important nutrient awaiting discovery," Dr. Spies said. "Many anemia patients who become allergic to liver extract can be safely and securely treated with folic acid as long as they do not develop nerve degeneration."

The anemias of sprue, pellagra and pregnancy and nutritional macrocytic anemia are all helped by folic acid.

"It is amazing," Dr. Spies stated, "that patients with tropical sprue, who subsist on a diet composed almost entirely of starchy foods, regenerate (rebuild) blood when they are given folic acid even when they continue to eat such a diet."

Science News Letter, May 31, 1947

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ALL ABOUT US—Eva Knox Evans—*Capitol Pub.,* 95 p., illus., $2. This story of people helps children understand the role custom and environment play in understanding other nations.

AMERICA'S NEEDS AND RESOURCES—J. Frederick Dewhurst and assoc.—*Twentieth Century Fund,* 812 p., $5. A survey of America's achievement in wartime and peacetime production with estimates for the future shows the trend toward increased productivity as the result of expanding use of machines and inanimate energy. The resultant benefits are more consumer goods and shorter work weeks.

AMERICA'S STAKE IN WORLD TRADE—Gloria Waldron and Norman S. Buchanan—*Public Affairs Committee,* Pamphlet No. 130, 32 p., paper, illus., 20 cents. Covers the relation of trade to world economy.

BIBLIOGRAPHY ON SCIENTIFIC PERSONNEL AND ITS RELATION TO THE CONDUCT OF RESEARCH IN GOVERNMENT, INDUSTRY, AND UNIVERSITIES—Scientific Personnel Branch—*Office of Naval Research,* Info. Series 4, SPB Series 16, 22 p., paper, free. Assembled from books, pamphlets, magazine articles, and legislative items, this compilation is intended for personnel officers, operating officials, and scientists.

BUSINESS MATHEMATICS: PRINCIPLES AND PRACTISE—R. Robert Rosenberg—*Gregg Pub.,* 3rd ed., 568 p., $1.84. A text for vocational courses in business arithmetic covering fundamental principles.

CHEMISTRY AND METHODS OF ENZYMES—James B. Sumner and G. Fred Somers—*Academic Press,* 2nd ed. rev., 415 p., illus., $6.50. A survey of enzymes for the research worker and advanced student.

CYCLES: THE SCIENCE OF PREDICTION—Edward R. Dewey and Edwin F. Dakin—*Holt,* 255 p., $3. With numerous graphs, the authors show trends in many fields over long and short periods of time. They imply that by investigating these, undesirable trends may be prevented.

THE CONSUMER'S ECONOMIC LIFE—Jessie Graham and Lloyd L. Jones—*Gregg Pub.,* 555 p., illus., $1.92. For secondary schools, a text to help the student plan intelligently the selection, purchase and use of goods and services.

THE ECHINODERM FAUNA OF AUSTRALIA; Its Composition and Its Origin—Hubert Lyman Clark—*Carnegie Inst.,* Publ. 566, 567 p., paper, $4; cloth, $4.50. Divided into two parts, this survey includes an annotated list of both fossil and recent echinoderms and their interrelationships.

ELECTRICITY: Principles, Practise Experiments—Charles S. Siskind—*McGraw-Hill,* 448 p., illus., $2.60. A text for senior high schools and junior colleges, this presentation of the general principles of direct and alternating current electricity shows how these principles apply to the more common circuits and how they may be experimentally verified.

FIBER TO FABRIC—*M. D. Potter—Gregg Pub.,* 314 p., illus., $2. For students, consumers, and anyone engaged in merchandising, this survey of the field of textiles, through differential qualities of fibers, preparation of yarn, and dyeing, should prove helpful.

THE FUTURE OF TELEVISION—Orrin E. Dunlap, Jr.—*Harper,* rev. ed., 194 p., illus., $3. A popular discussion of this new industry and its future development and service.

IN SEARCH OF BEAUTY IN MUSIC—Carl E. Seashore—*Ronald Press,* 389 p., $4.50. This scientific approach to musical esthetics outlines the present instrumental aids for improving teaching and performance, and postulates for the future many innovations.

THE MARINE ALGAE OF THE COOS BAY-CAPE ARAGO REGION OF OREGON—Ethel I. Sanborn and Maxwell S. Doty—*Oregon State College,* 66 p., illus., paper, 75 cents.

POWER FACTOR IN YOUR PLANT—W. C. King—*Cornell-Dubilier Elec. Corp.,* 214 p., illus., $3. A non-technical discussion of this ratio and its importance in operating efficiency of plant equipment. Written for maintenance men, it is intensely practical.

PRIMER FOR HOME BUILDERS—Allen Carpenter, Norman Guess and ed. of Popular Mechanics—*Windsor Press,* 171 p., $2.50. Designed to help the inexperienced understand what is involved in building a house so that he will get a good proportion of the things he wants and be able to pay the bills too.

REPTILES AND AMPHIBIANS OF THE NORTHWESTERN STATES—Roger Conant *Zoological Soc. of Phila.,* 40 p., illus., paper, $1. Description and illustrations of all species of snakes, lizards, turtles, frogs, toads, and salamanders of the 11 states from Maine to Maryland.

THIS IS OUR LAND: The Story of Conservation in the United States—E. G. Cheyney and T. Schantz-Hansen—*Webb,* 344 p., illus., $3. A history of the resources of our country and measures necessary to protect them.

VIRUSES AND VIRUS DISEASES OF PLANTS—Melville T. Cook—*Burgess,* 244 p., illus., paper, $4. For plant pathologists, botanists and graduate students, this compilation will prove invaluable; both subject and author index included an exhaustive bibliography.

WHO'S WHO IN LATIN AMERICA: PART IV: BOLIVIA, CHILE, AND PERU—Ronald Hilton, ed.—*Stanford Univ. Press,* 3rd ed. rev., 209 p., $2.50.

Science News Letter, May 31, 1947

PSYCHOLOGY

Brain Waves Show Students Should Study Longer Hours

➤ BRAIN WAVES spell bad news for students who complain of brain fag at the end of an eight-hour class day.

The eight-hour day does not produce severe mental fatigue and should be lengthened, Drs. F. C. Barnes and Marie D. Amoroso, of Hahneman Medical College, Philadelphia, reported to the Federation of American Societies for Experimental Biology meeting in Chicago.

Students' brain wave records at eight a.m. and five p.m. told the story. Alpha waves, which disappear when persons are tired out, were still present in the students' five p.m. records.

Science News Letter, May 31, 1947

CHEMISTRY

Sulfuric Acid Sludge Used In Phosphate Production

➤ FOOD PRODUCTION calls for fertilizer, and among fertilizers phosphate is one of the most important. Unusual interest therefore attaches to a newly patented process in which sulfuric acid sludge, a waste product in oil refining, is used instead of new sulfuric acid in treating ground phosphate rock to produce superphosphate fertilizer.

In the method now in use, a mixture of phosphate rock and sulfuric acid is left for a time in "dens", while the gases caused by the acid's action froth up and lighten the product. Even so, it takes stiff digging, sometimes blasting, to get it out for sacking and shipping.

By using the sulfuric acid sludge, claims John Stauffer, Jr., of Los Angeles, originator of the process, the mixture in the dens foams up more thoroughly, due partly to the evaporation of the residual hydrocarbons in the sludge, and when the finished fertilizer has dried out it is already in powder form, ready to flow down chutes into the bags.

U. S. patent 2,418,203 has just been issued on this process.

Science News Letter, May 31, 1947

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❁ *AWNING PAINT, an improved type in a dozen colors, makes faded canvas look like new. It leaves the fabric flexible, is sun-resistant, water-repellent and easily applied. It also gives protection against rot and mildew. The same paint is suitable for canvas lawn chairs.*

Science News Letter, May 31, 1947

❁ *SLIDE RULE for druggists is a direct reading calculator for weights and measures, temperature and formula conversions. Made of plastic, it is easily cleaned. It is suitable for chemists, photographers and other laboratory workers.*

Science News Letter, May 31, 1947

❁ *SPIRIT LEVEL, about one foot long, for carpenters and other workers, is made of a transparent plastic with seven small spirit tubes to indicate various angles. The center tube is used for leveling. The others are for six different angles, the degree of each being molded into the plastic.*

Science News Letter, May 31, 1947

❁ *MINNOW BUCKET for fishermen keeps the bait alive in constantly changing water. It is a double-cylinder device, with an inner container for the fish, and it floats as shown in the picture. When floating, water enters between the inner and outer walls, and into the fish chamber through holes near the top.*

Science News Letter, May 31, 1947

❁ *THREE-BAND portable radio, for use in pleasure boats or airplanes, provides air and marine communications reception and regular radio programs. It can be used as an aid when navigating on aviation range stations, marine radio beacons and broadcast stations. The radio is battery or generator-powered.*

Science News Letter, May 31, 1947

❁ *STEEL measuring tape has a case flattened on one edge for easy standing, and a plastic window on the curved opposite side through which the tape is read. A cross hairline makes reading easier. When the tape is completely rolled, the hairline reading is two inches, which is also the length of the base of the case.*

Science News Letter, May 31, 1947

❁ *COLLAPSIBLE hanger can be slipped into or out of a dress or blouse without unbuttoning the garment. One arm of the plastic device is hinged and can be extended or folded up by the flick of a trigger.*

Science News Letter, May 31, 1947

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Question Box

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How successful was the eclipse expedition? p. 340.

What besides the moon will be the brightest object in the June skies? p. 346.

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